

# Enhanced Delta Smelt Monitoring

## Preliminary Abundance Analysis

### Phase 3 Sampling

**DRAFT**

U.S. Fish and Wildlife Service

July 10, 2017

## Overview

Beginning July 2017, the Enhanced Delta Smelt Monitoring (EDSM) program started its Phase 3 sampling program. The Bay-Delta has been divided into eight geographic strata:

- Western Delta
- Suisun Bay Marsh (Suisun Bay and Marsh)
- Lower Sacramento
- Cache Slough LI (Cache Slough and Liberty Island)
- Sac DW Ship Channel (Sacramento Deep Water Shipping Channel)
- Upper Sacramento
- Lower San Joaquin
- Southern Delta

Sampling locations are generated using a generalized random-tessellation stratified (GRTS) design [1] with stratification and equal probability sampling. Trawling gear similar to that used in the California Department of Fish and Wildlife's [Spring Kodiak Trawl Survey](#) is used to conduct multiple tows per location.

Everything presented here is preliminary and subject to correction, revision, and improvement. The following points should be taken into consideration when interpreting the results:

1. Delta smelt caught in the wings of the net (as opposed to the live box or cod end) were excluded from this analysis. Fish caught in the wings are indicated by a Gear Condition Code of 9.
2. The **Week** designations used here were defined out of convenience and are subject to change.
3. Current sampling is limited to areas of the Bay-Delta with a depth of at least 8 feet at mean tide. The abundance estimation method used here assumes that the density of fish in unsampled areas (i.e., those with depth less than 8 feet) is the same as in sampled areas (i.e., those with depth greater than or equal to 8 feet).
4. The methods of analysis used here remain in development.

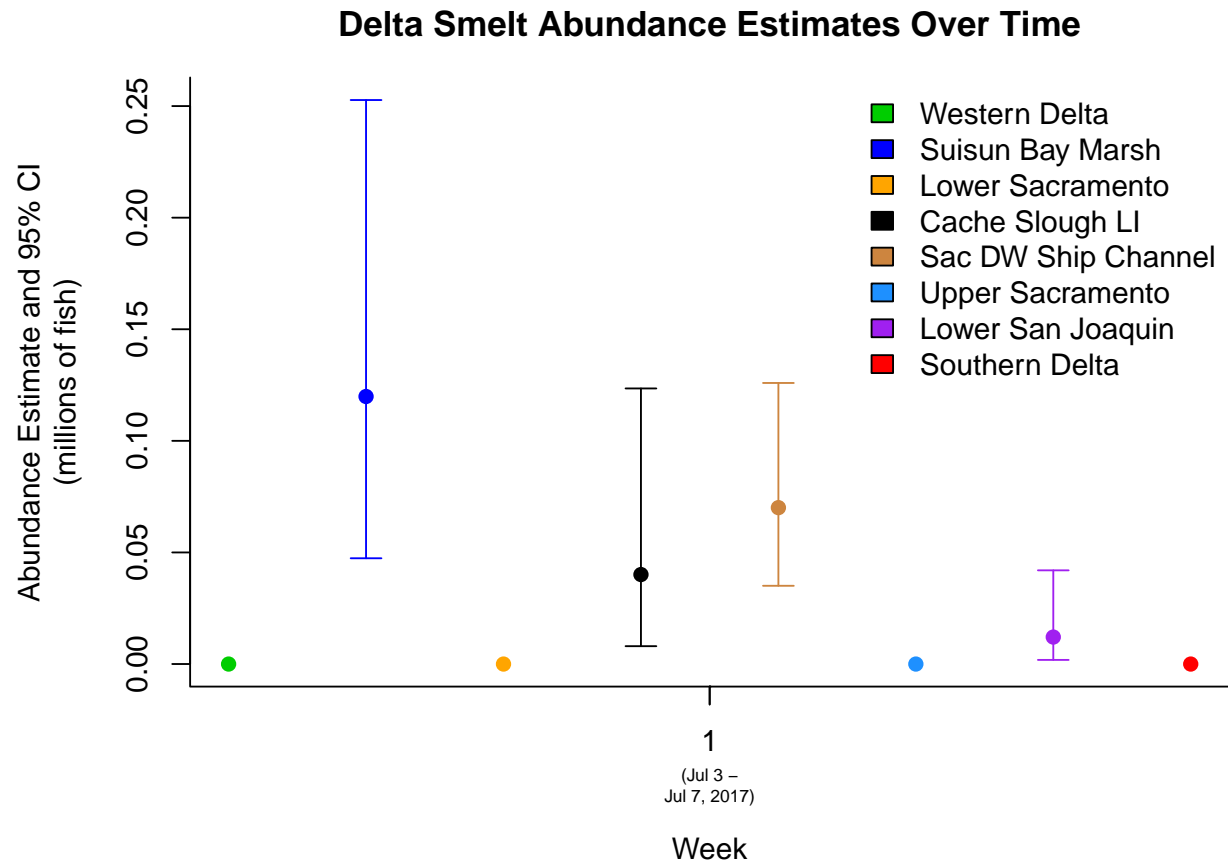
## Change Log

No changes reported.

## Results

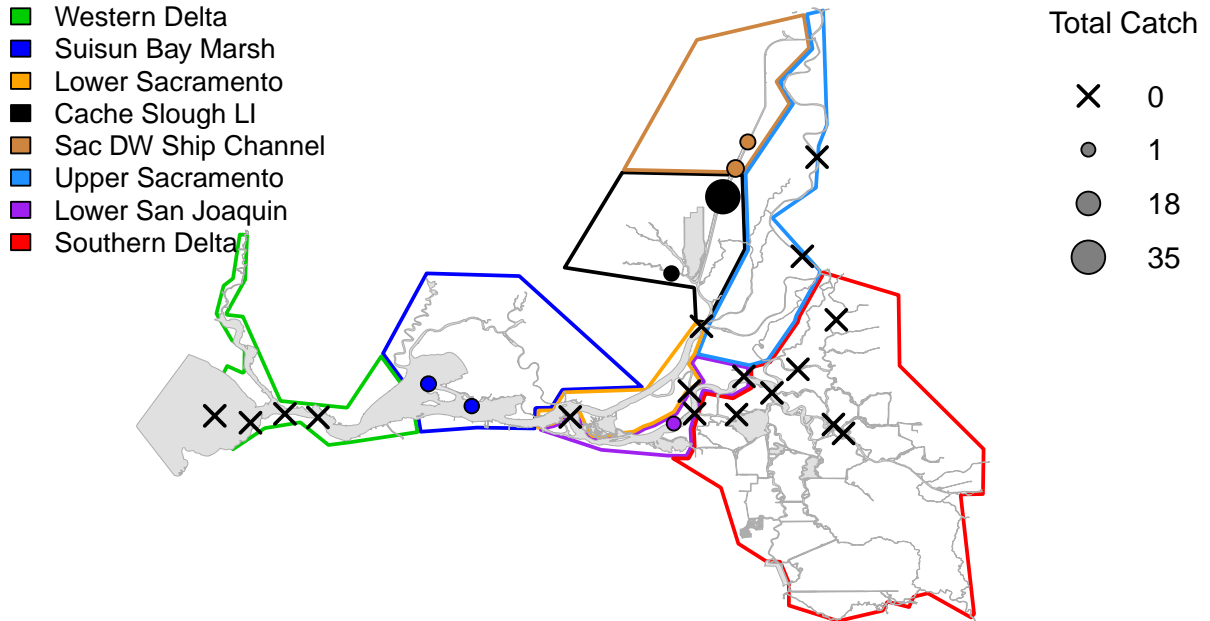
Table 1: Delta smelt catch summary and abundance estimates by week. An asterisk (\*) is used to emphasize weeks when no delta smelt were caught and a dash (-) is used to indicate that sampling did not occur or that a quantity could not be calculated. In order to avoid confusion, weekly totals are currently only calculated when sampling has occurred in every stratum.

Stratum	Number of Sites	Number of Tows	Number Caught	Estimate and 95% CI		
				Abundance	Lower Bound	Upper Bound
Week 1: July 3 - July 7, 2017						
Western Delta	4	32	0	0*	-	-
Suisun Bay Marsh	2	5	5	119,883	47,391	252,716
Lower Sacramento	2	10	0	0*	-	-
Cache Slough LI	2	3	37	40,101	7,998	123,480
Sac DW Ship Channel	2	4	9	70,077	35,057	125,938
Upper Sacramento	2	13	0	0*	-	-
Lower San Joaquin	4	20	1	12,091	1,845	41,979
Southern Delta	6	48	0	0*	-	-
Total	24	135	52	242,152	136,369	398,928

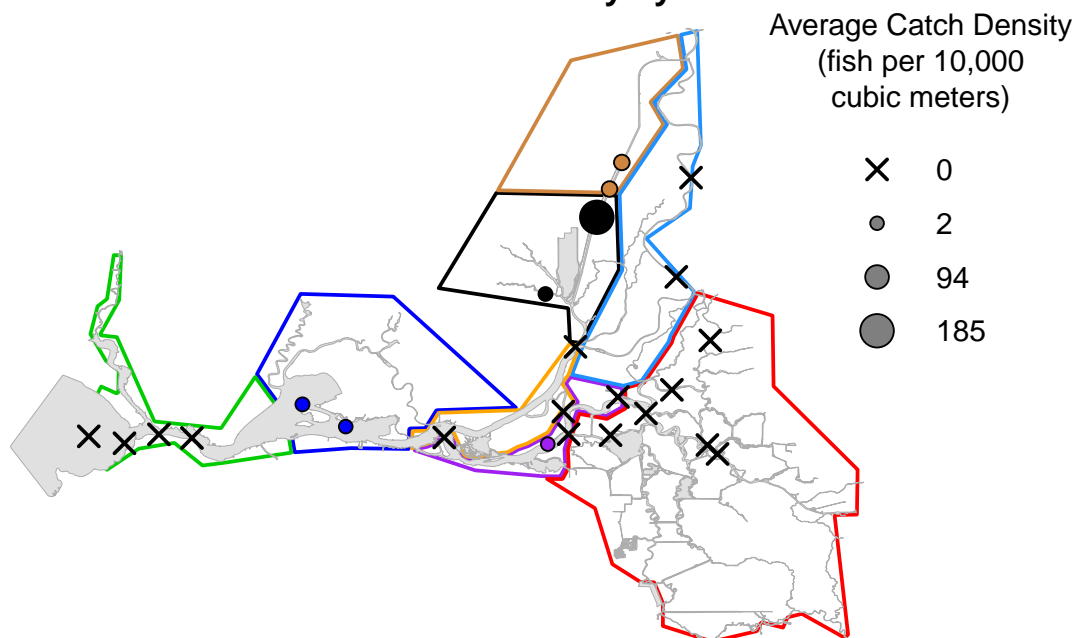


## Week 1 (Jul 3 – Jul 7, 2017)

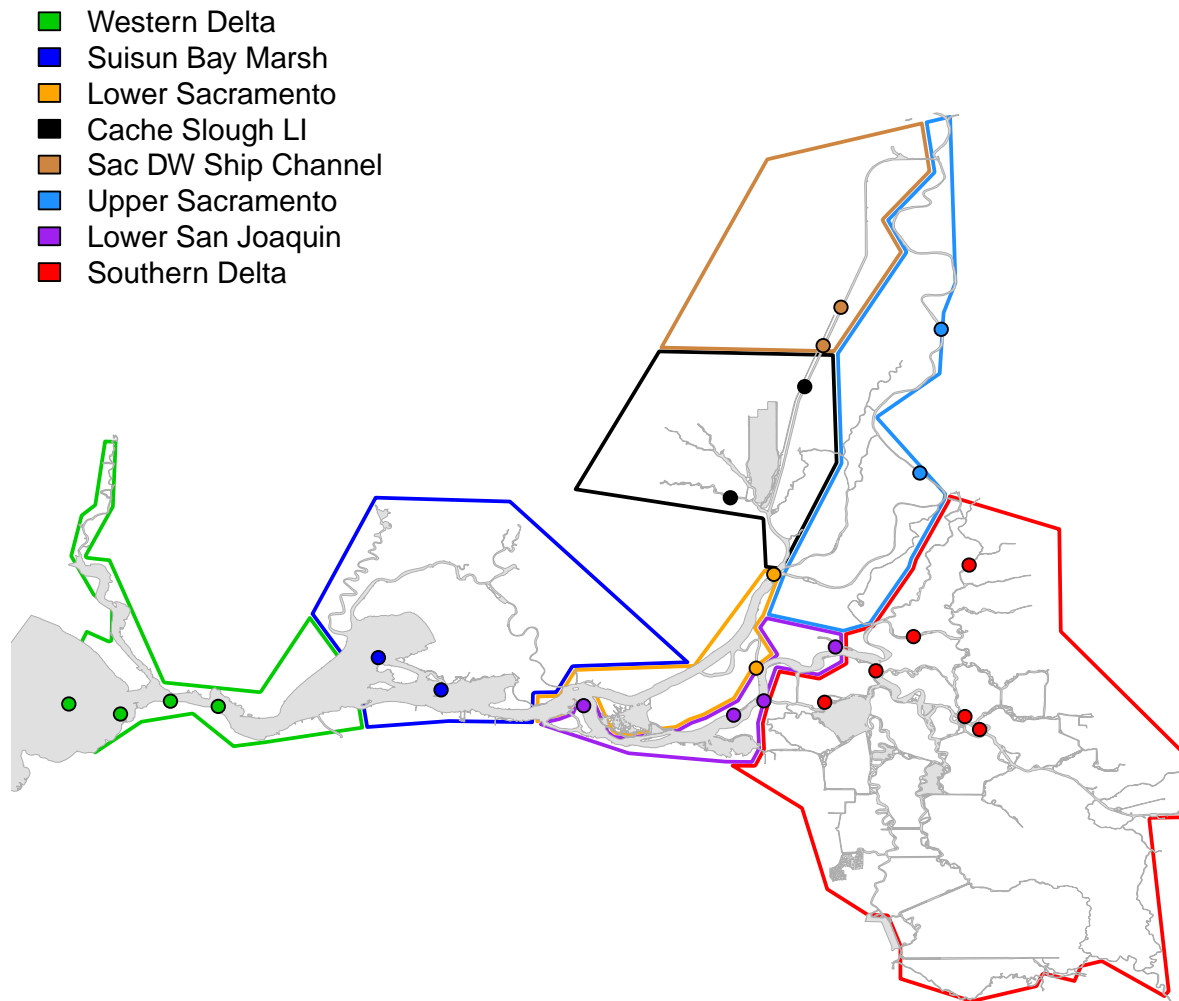
### Delta Smelt Total Catch by Site



### Delta Smelt Catch Density by Site



## All Sampling Locations To Date



## References

- [1] Stevens, Don L., Olsen, Anthony R. 2004. Spatially balanced sampling of natural resources, *Journal of the American Statistical Association*, 99(465): 262 – 278.